

Patent claims

1. A razor, in particular for wet shaving, with a body comprising a handle region (10), a head region (14) and a neck region (12) located between the handle region (10) and the head region (14), and with functional components which are at least partly arranged within the body and comprise an electrically operated vibration device (20) for producing vibrations in the head region and an electrical supply device, having an energy store (24), for the vibration device (20), wherein the body comprises at least one hard component (16), serving as a reinforcement, and at least one further plastic component (18), produced by the injection-molding process, at least some of the functional components being at least partly encapsulated directly with the further plastic component (18).
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2. The razor as claimed in claim 1, wherein the further plastic component (18) is a soft component.
3. The razor as claimed in claim 1 or 2, wherein the hard component (16) consists of a plastic, produced in particular by the injection-molding process, or a metallic material, which is preferably involved in the electrical circuit of the supply device.
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- 30 4. The razor as claimed in one of the preceding claims, wherein the functional components are arranged in the region of the boundary zone between the hard component (16) and the further plastic component (18).
- 35 5. The razor as claimed in one of the preceding claims, which comprises a cavity (28), which is formed in the hard component (16), in the handle region (10), and the dimensions of which are

adapted to the dimensions of the energy store (24), in particular a battery or a storage-battery subassembly (82).

- 5 6. The razor as claimed in claim 5, wherein the functional components seal the cavity (28) with respect to the further plastic component (18).
- 10 7. The razor as claimed in claim 5 or 6, wherein the cavity (28) has at the end of the body remote from the head region an opening which can be closed by a cover element (70).
- 15 8. The razor as claimed in claim 7, wherein the cover element (70) can be removed entirely or partly, in particular to exchange the energy store (24) or to gain access to the energy store (24) for the purpose of re-charging.
- 20 9. The razor as claimed in one of the preceding claims, wherein functional components are connected to one another by means of a flexible electrical line (42, 44), preferably a metal wire.
- 25 10. The razor as claimed in one of the preceding claims, wherein the vibration device (20) is arranged in the neck region (12) and is at least partly encapsulated with the soft component.
- 30 11. The razor as claimed in one of the preceding claims, wherein a vibration-damping region (32) is arranged between the vibration device (20) and the handle region (10).
- 35 12. The razor as claimed in one of the preceding claims, wherein the supply device comprises a rechargeable energy store (24) and at least one contact element (206).

13. The razor as claimed in claim 12, wherein the energy store (24) is arranged within a cavity (28) in the handle region (10), the cavity (28) being sealed by a sealing element, in order to prevent
5 contact of the energy store with splash water and other foreign matter.
14. The razor as claimed in claim 13, wherein the energy store (24) and the least one contact element
10 (206) are arranged within the cavity (28), the cavity (206) being closable and able to be opened at least to the extent that the at least one contact element (206) is accessible from the outside, at least for the charging operation.
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15. The razor as claimed in claim 13 or 14, wherein the cavity (28) is formed in a first housing part and can be closed by a second housing part, formed in particular as a cover (70), the first and second
20 housing parts preferably being screwed to one another, in particular by a thread with distance limitation.
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16. The razor as claimed in claim 15, wherein a switch (224) by which the vibration device (20) is deactivated in the open position of the housing parts interacts with the second housing part.
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17. The razor as claimed in claim 16, wherein the switch (224) comprises the contact element (206) and a part (72) that is movable in relation to the latter, the movable part (72) entering into an electrically conductive connection with the contact element (206) in the closed position.
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18. The razor as claimed in one of claims 12-17, wherein the contact element (206) has a pin (208), which is connected in an electrically conductive

manner, preferably directly, to a terminal of the energy store (24).

19. The razor as claimed in claim 12, wherein the at 5 least one contact element (206) is arranged within a clearance in the razor body, with the result that it is offset inward in relation to the outer surface of the razor body, the clearance preferably being oriented away from the head region.
- 10 20. The razor as claimed in claim 19, wherein the shape of the clearance is adapted to the shape of a further contact element of a power supply unit for the energy store.
- 15 21. A method for producing a razor, in particular a wet razor, as claimed in one of the preceding claims, in which
- 20 - the body is produced from at least one hard component (16), serving as a reinforcement, and at least one further plastic component (18), molded on by the injection-molding process,
- 25 - and at least some of the functional components are at least partly encapsulated directly with the further plastic component during the production of the body.
- 30 22. The method as claimed in claim 21, wherein a soft component is used as the further plastic component (18).
- 35 23. The method as claimed in claim 21 or 22, wherein firstly a first component (16) is produced without functional components and then at least some functional components are positioned and fixed on the first component (16), the unit made up of the first component and the functional components

subsequently being at least partly encapsulated with at least one further plastic component (18).

24. The method as claimed in claim 23, wherein the 5 functional components that are at least partly encapsulated with the further plastic component (18) comprise the vibration device (20), the electrical lines (42, 44) and preferably also at least one contact pin (46) for establishing an 10 electrically conductive connection with the energy store.
25. The method as claimed in one of claims 21-24, 15 wherein at least some functional components are arranged on the already produced hard component (16) in such a way that, in relation to the direction of flow of the further plastic component (18) that is still to be injection-molded, at least certain regions of the functional components are 20 located in the shadow of at least one protective portion of the hard component (16).
26. The method as claimed in one of claims 21-25, 25 wherein the functional component or a subassembly of functional components which extends over a substantial part of the length of the body is encapsulated.
27. The method as claimed in one of claims 21-26, 30 wherein at least the hard component (16) is provided with a holding or fixing region for one or more electrical lines (42, 44), which preferably runs in the longitudinal direction and is preferably formed in the manner of a groove.
- 35 28. The method as claimed in one of claims 21-27, wherein a first housing part is produced with at least one cavity (28), which is intended for one or more functional components to be inserted later, in

particular the energy store, and has, preferably at the end of the body remote from the head region, an opening for the insertion of the corresponding functional components.

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29. The method as claimed in claim 28, wherein a second housing part (70) is produced for sealing the cavity and, after the insertion of functional components into the cavity (28), is fitted in place 10 on the opening of the latter, preferably in a sealing manner.
30. The method as claimed in one of claims 21-29, 15 wherein an actuating region which can be pressed in for actuating at least one electrical functional component, in particular a switching region (30) for activating a switching element (36) for switching the razor on and off, is formed by injection molding of the further plastic component 20 (18), preferably the soft component.
31. The method as claimed in one of claims 21-30, 25 wherein a vibration-damping region of the body, located in particular in the neck region (12) or in the region of the transition between the neck region (12) and the handle region (10), is formed from at least two different material components (16, 18).
- 30 32. The method as claimed in claim 31, wherein, for 35 forming the vibration-damping region (32), the hard component (16) is produced with a pattern of recesses (34), and in that the recesses (34) are subsequently filled during the injection molding of the soft component (18).
33. The method as claimed in one of claims 21-32, wherein a soft component is injected at a single

injection point as the further plastic component (18).

34. A razor, in particular for wet shaving, with a body comprising a handle region (10), a head region (14) and a neck region (12) located between the handle region (10) and the head region (14), and with functional components which are at least partly arranged within the body and comprise an electrically operated vibration device (20) for producing vibrations in the head region and an electrical supply device, having an energy store (24), for the vibration device (20), the head region having a holding device for an exchangeable blade and the vibration device being arranged in the region of the holding device.
35. The razor as claimed in claim 34, wherein the vibration device comprises a motor with a flywheel arranged eccentrically in relation to an axis of rotation.
36. The razor as claimed in claim 35, wherein the vibration device is arranged in the body in such a way that the vibration of the vibration device during use produces a movement of the cutting edges of the shearing blades of the exchangeable blade, which runs substantially in the plane defined by the cutting edges.
37. The razor as claimed in claim 35, wherein the vibration device is arranged in the body in such a way that the vibration of the vibration device during use produces a movement of the cutting edges which runs substantially perpendicularly in relation to the plane defined by the cutting edges of the shearing blades of the exchangeable blade.

38. The razor as claimed in claim 35, wherein the vibration device is arranged in the body in such a way that the axis of rotation forms an angle of at least $\pm 60^\circ$ with a longitudinal axis of the head region, preferably is perpendicular to this longitudinal axis of the head region.

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39. The razor as claimed in claim 35, wherein the vibration device is arranged in the body in such a way that the axis of rotation forms an angle of at most $\pm 30^\circ$ with a longitudinal axis of the head region, preferably is perpendicular to this longitudinal axis of the head region.

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15 40. The razor as claimed in claim 35, 36 or 38, wherein the motor and the flywheel are arranged within a sleeve, the extent of which along the axis of rotation is less than its extent perpendicular to the axis of rotation.

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41. The razor as claimed in claim 35, 37 or 39, wherein the motor and the flywheel are arranged within a sleeve, the extent of which along the axis of rotation is more than its extent perpendicular to the axis of rotation.

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42. The razor as claimed in claim 34, wherein the vibration device is arranged in a recess in the head region, in the region of the holding device.

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43. A method for producing a razor, in particular a wet razor, as claimed in one of the preceding claims, in which

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- a body with a handle region, a head region and a neck region lying in between is produced from at least one hard component, serving as a reinforcement, and at least one further plastic

component, molded on by the injection-molding process;

- 5 - during the production of the body, a recess for a vibration device is produced in the hard component, in the head region;
- 10 - connecting lines for establishing an electrically conductive connection between the vibration device and an energy store of an electrical supply device are laid to the hard component and encapsulated with the further plastic component during the production of the body; and
- 15 - the vibration device is inserted into the recess and connected to the connecting lines, and the recess is closed.